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EFFECTS OF THE BOMBING OF BRIDGES
ON THE NORTH VIETNAMESE ECONOMY AND LOGISTICS

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S-E-C-R-E-T

EFFECTS OF THE BOMBING OF BRIDGES
ON THE NORTH VIETNAMESE ECONOMY AND LOGISTICS

During the first 23 days of April, US and South Vietnamese planes destroyed or severely damaged a number of bridges on railroads and roads in the southern panhandle area of North Vietnam.* The destruction of these bridges is believed to have made the rail line between the Thanh Hoa** area and Vinh inoperable. It also has increased the time required for truck movements and has reduced the capacity of the roads affected, and it may cause some shift to sea transportation. The bombing has thus disrupted the normal pattern of transportation service in the southern half of the country.

Nevertheless, the effect of the destruction of these bridges on the over-all economy of North Vietnam is estimated to be minor. The southern part of the country accounts for only a small share of the nation's industrial and agricultural output. Increased use of coastal shipping can accommodate the normal economic traffic between the northern and southern parts of the country. Military supplies that are believed to have been moving south by railroad as far as Vinh also can be moved either by coastal shipping, at considerable increases in time, or by the use of about 100 trucks in addition to those that have been used in the past.

The chief effect of the bombing of these bridges, therefore, appears to have been to increase the time required for traffic movements in the area, to reduce the capacity of the transportation system and its flexibility, and to increase the requirements for motor trucks and coastal shipping. It is unlikely that through rail traffic will be restored in the near future, but temporary repairs may be made to some bridges or bypasses may be constructed so that highway traffic can continue to move.

* This publication contains information available to this Office as of 23 April 1965. See the table, below, and the map, Figure 1, for locations, and the photographs, Figures 2 through 4, for examples of damage done to bridges. The assessment of the physical damage to the targets analyzed in this publication is based on the Preliminary Bomb Damage Reports prepared by military units in the field.

** Thanh Hoa is about 130 km south of Hanoi.

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1. Bridges Destroyed by Bombing

Between 3 and 13 April 1965, nine bridges in North Vietnam were either destroyed* or severely damaged by aerial bombing; of these, five had been newly constructed during the last 2 years. Of the nine bridges, five were highway bridges, one was a railroad bridge, and three were combination railroad and highway bridges. All but two of the bridges were located along route 1, the major north-south route between Hanoi and the Demarcation Line. One of the two bridges not on route 1 was the Khe Kien Highway Bridge located on route 7, about 45 kilometers (km) by road from the Laotian border. The second of these bridges was located at Kim Cuong on route 8, about 15 km from the Laotian border. Route 7 is a major supply road, and route 8 is a minor supply road, for trucks carrying supplies to Communist forces in Laos.

The highway bridge at Kim Cuong, which was destroyed on 10 April, was attacked again on 16 April and another span was dropped. Six other bridges were attacked on the same day. One of these was the Dien Chau Railroad Bridge between Thanh Hoa and Vinh. Two other rail bridges south of Vinh were hit: the bridge at Trai Hoi was destroyed, and the railway bridge at Bai Duc Thon received minor damage. The highway bridge on route 12 at Bai Duc Thon was destroyed, but truck traffic may be able to move over the rail bridge if it is not too badly damaged. Two highway bridges at Xom Ca Trang, also on route 12, were destroyed, but it is possible that they may be bypassed by using two old fords located in the area.

On 23 April, seven more highway bridges in the southern part of North Vietnam were bombed and either destroyed or badly damaged. Five of these bridges were located on route 1 between Thanh Hoa and Dong Hoi. One of the other bridges was located at Phuc Thiem on route 7, just west of route 1. The remaining bridge, at San Dinh, was on a road connecting with route 1. Most of the bridges bombed on 23 April reportedly can be bypassed without too much difficulty.

* The term destroyed as used in this publication means that one or more bridge spans were either dropped or rendered completely useless as a structural component of the bridge.

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2. Effect on the North Vietnamese Economy and Logistics

The southern half of North Vietnam -- that affected by the bombing of the bridges -- is economically of minor significance. Most of the country's industry and more than 80 percent of its cultivated land are located in the northern half of the country. The southern half produces primarily lumber and a little rice. Economic traffic moving south to the Vinh area has included coal, petroleum, corn, fertilizer, steel products, and construction materials. Lumber and logs, some of which come from southern Laos, are the primary materials moved north. A considerable share of this traffic has been moving by coastal ships and barges through Ben Thuy, the port for Vinh.

Temporary structures, bypasses, or ferries can be improvised within a few weeks for most of the road bridges, and road traffic will be able to bypass each of the bombed bridges with a detour involving only a small increase in the total driving time. The increased cost to the North Vietnamese economy of the extra driving time and distance required for motor vehicles to bypass all the bombed bridges probably would not be great.

Four railroad bridges have been destroyed on the line between Hanoi and Vinh. It is assumed, therefore, that the rail line between Dong Phong Thuong, about 20 km north of Thanh Hoa, and Vinh is inoperable. This line is probably the least important rail line in North Vietnam from an economic viewpoint. Rail traffic between Hanoi and the important industrial center of Nam Dinh, located north of the bombed bridges, will not be affected, and there are no major economic centers south of these bridges. Until May 1964 the reconstruction of the Hanoi-Vinh rail line that was destroyed during the Indochina War had been completed only as far south as Ham Rong, on the northern bank of the Song Ma and across the river from Thanh Hoa. After the Thanh Hoa (Ham Rong) bridge was completed in May 1964, through railroad service was established to and from Vinh, and the North Vietnamese announced a schedule of two mixed passenger and freight trains each way per day on the Thanh Hoa - Vinh line. On the basis of information obtained from aerial photographs and foreign observers, this schedule generally has been confirmed.

The volume of freight carried on the Thanh Hoa - Vinh rail line is estimated to have been about 400 metric tons moving both ways per day

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in the second half of 1964, or less than 5 percent of the total tons carried by the entire railroad system of North Vietnam during the period -- an indication of the minor role this line played in the economy of the country. This low level of traffic emphasizes the fact that the economic justification for reconstruction of the rail line to the southern part of the country was minor. The reconstruction of the line probably was part of a contingency plan to support increased military activity in the provinces south of the 17th parallel with the eventual aim of unifying North and South Vietnam.

It would have been logical for the Thanh Hoa - Vinh section of the rail line to have carried a large percentage of the military supplies that ultimately were moved over the strategic roads serving Communist forces in the area of the Plaine des Jarres, in southern Laos, and in North Vietnam south of Vinh and possibly were destined for infiltration to Communist forces in the northern part of South Vietnam, although there is no definitive information to support this assumption. Moreover, there is no information on the amount of military supplies actually transported on this rail line, but the combined requirements for these forces have been estimated at from 100 to 120 metric tons per day, well within the estimate of the freight carried on the Thanh Hoa - Vinh section of the rail line.

If the rail line between Dong Phong Thuong, north of Thanh Hoa, and Vinh is inoperable and if it were necessary to shift transport of a maximum of 120 tons of supplies estimated to be required for the Communist forces from rail to road transport, it is estimated that approximately 100 more trucks would be needed to carry these supplies.* Although North Vietnam does not have an abundant supply of trucks, gasoline, and spare parts, it is estimated that the civilian and military inventory does include at least 10,000 vehicles. There probably will be a shortage of tank trucks for the transport of petroleum, however. The major roads in the southern part of North Vietnam probably still have sufficient capacity to carry considerable troops and supplies. The effect of the bombing of the rail and road bridges south of Vinh may be to slow down somewhat, but not to stop, the flow of traffic down routes 1 and 12 to Communist forces in Laos and the northern part of South Vietnam.

* Assuming that each truck carries a 3-ton load, 40 trucks would be required daily to travel the 100 km (62 miles) from Dong Phong Thuong to Vinh and another 40 to make the return trip. An extra 25 percent has been included to account for those trucks that are out for repairs and maintenance.

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It is possible that the North Vietnamese have stockpiled some supplies in the southern half of the country in anticipation of the bombing of their transport system by US or South Vietnamese planes. In the short run, therefore, these stockpiles could be used to lessen temporarily the requirements for transport. The use of sea transport can be increased to some extent to lighten the requirements placed on land transport. It appears, therefore, that the chief effect of the bombing of these bridges has been to increase the time required for transport movements in the area, to reduce the capacity of the transportation system and its flexibility, and to increase moderately the requirements for motor trucks and coastal shipping. The immediate consequences for the economy and the military establishment probably have been to create local shortages in such essentials as petroleum because of the disruption of the normal distribution system. In the longer run the consequences will include minor diversion of trucks and shipping, manpower, and materiel to this area from other essential uses in North Vietnam.

3. Prospects for Repairing the Damaged Bridges

It is unlikely that the North Vietnamese will choose to restore completely all of the damaged bridges in the near future. The railroad bridges in particular probably will not be repaired immediately, because (1) the railroad is extremely vulnerable to further interdiction, (2) steel members for the destroyed spans must be imported from Communist China, and (3) the rainy season is rapidly approaching and construction work on bridges is difficult during periods of high water. On the other hand, the North Vietnamese may attempt to repair the smaller highway bridges before the rainy season starts by constructing temporary wooden spans over destroyed sections. This effort would be an inexpensive expedient that could be completed within 2 weeks to a month.

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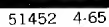
Bridges in North Vietnam Destroyed or Damaged by Bombing a/
as of 23 April 1965

Bridge	Coordinates	Date Bombed	Location
Dong Phong Thuong Railroad and Highway Bridge	19-58N 105-50E	3 Apr 65	Route 1
Thanh Hoa Railroad and Highway Bridge	19-50N 105-47E	4 Apr 65	Route 1
Dong Hoi Highway Bridge	17-27N 106-37E	4 Apr 65	Route 1
Qui Vinh Railroad Bridge	19-15N 105-41E	9 Apr 65	Near route 1
Phuong Can Highway Bridge	19-14N 105-42E	9 Apr 65	Route 1
Tam Da Railroad and Highway Bridge	18-50N 105-36E	9 Apr 65	Route 1
Khe Kien Highway Bridge West	19-16N 104-21E	9 Apr 65	Route 7
Kim Cuong Highway Bridge	18-26N 105-13E	10 Apr 65	Route 8
Thanh Yen Highway Bridge	17-38N 106-31E	13 Apr 65	Route 1
Bai Duc Thon Railroad Bridge	18-04N 105-39E	16 Apr 65	Near route 12
Bai Duc Thon Highway Bridge	18-04N 105-39E	16 Apr 65	Route 12
Xom Ca Trang Highway Bridge	17-57N 105-49E	16 Apr 65	Route 12
Xom Ca Trang Highway Bridge North	17-57N 105-49E	16 Apr 65	Route 12
Kim Cuong Highway Bridge	18-26N 105-13E	16 Apr 65	Route 8
Dien Chau Railroad Bridge	18-58N 105-34E	16 Apr 65	Near route 1
Trai Hoi Railroad and Highway Bridge	18-21N 105-37E	16 Apr 65	About 35 km South of Vinh
Xom Phuong Highway Bridges (two bridges)	17-32N 106-33E	23 Apr 65	Route 1
San Dinh Highway Bridge	18-24N 105-43E	23 Apr 65	Road connecting with route 1
Xom Gia Highway Bridge	18-25N 105-48E	23 Apr 65	Route 1
Tho Son Highway Bridge	18-27N 105-46E	23 Apr 65	Route 1
Phuc Thiem Highway Bridge	18-57N 105-34E	23 Apr 65	Route 7
Ly Nhan Highway Bridge	19-00N 105-35E	23 Apr 65	Route 1

a. Based on preliminary assessments of bomb damage. Each bridge included on this list had one or more spans dropped or destroyed, except the Thanh Hoa Bridge, which was stated to be "badly damaged"; the San Dinh and Xom Gia Bridges, which reportedly were damaged; and the Bai Duc Thon Railroad Bridge, which reportedly received only minor damage.

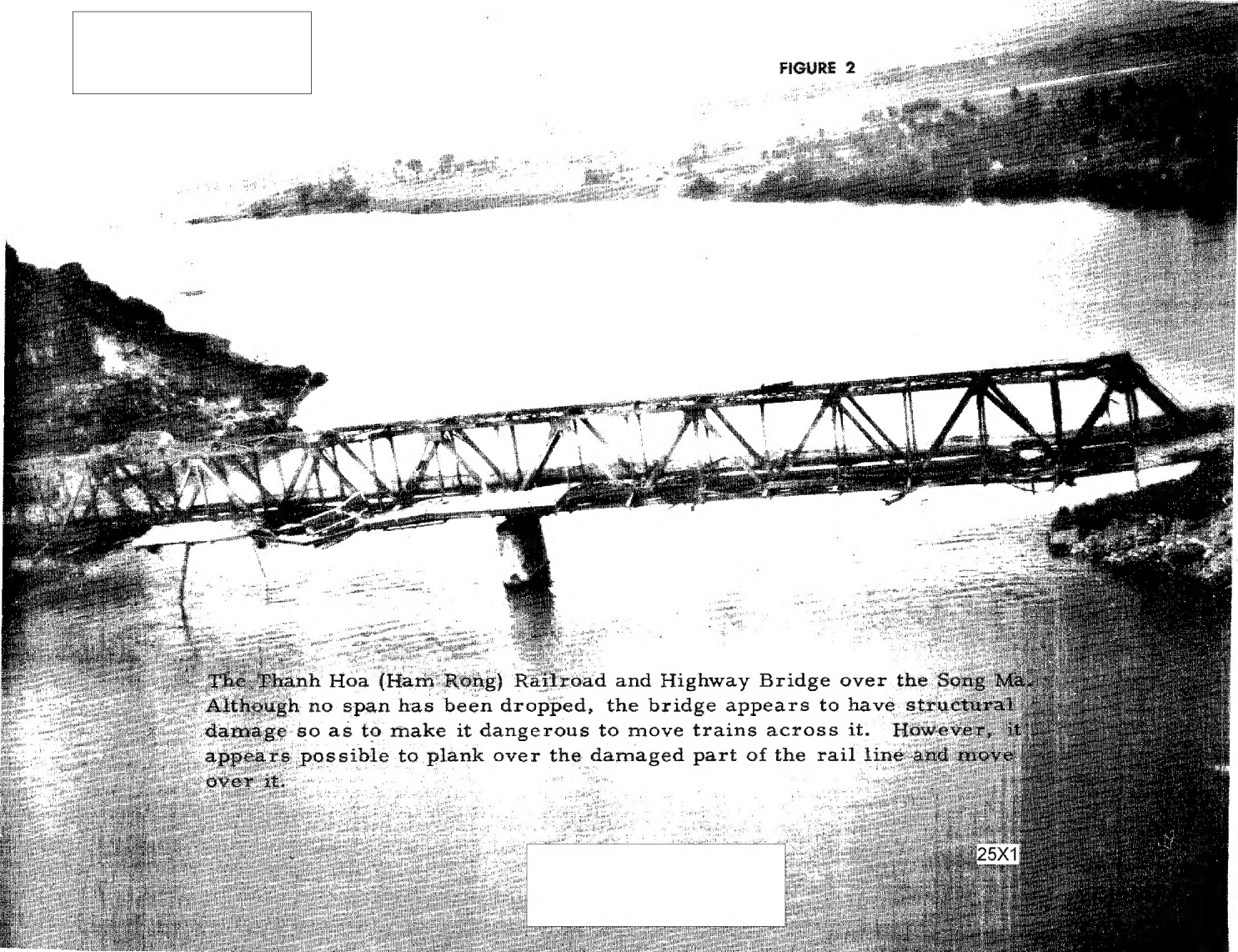
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FIGURE 2



The Thanh Hoa (Ham Rong) Railroad and Highway Bridge over the Song Ma. Although no span has been dropped, the bridge appears to have structural damage so as to make it dangerous to move trains across it. However, it appears possible to plank over the damaged part of the rail line and move over it.

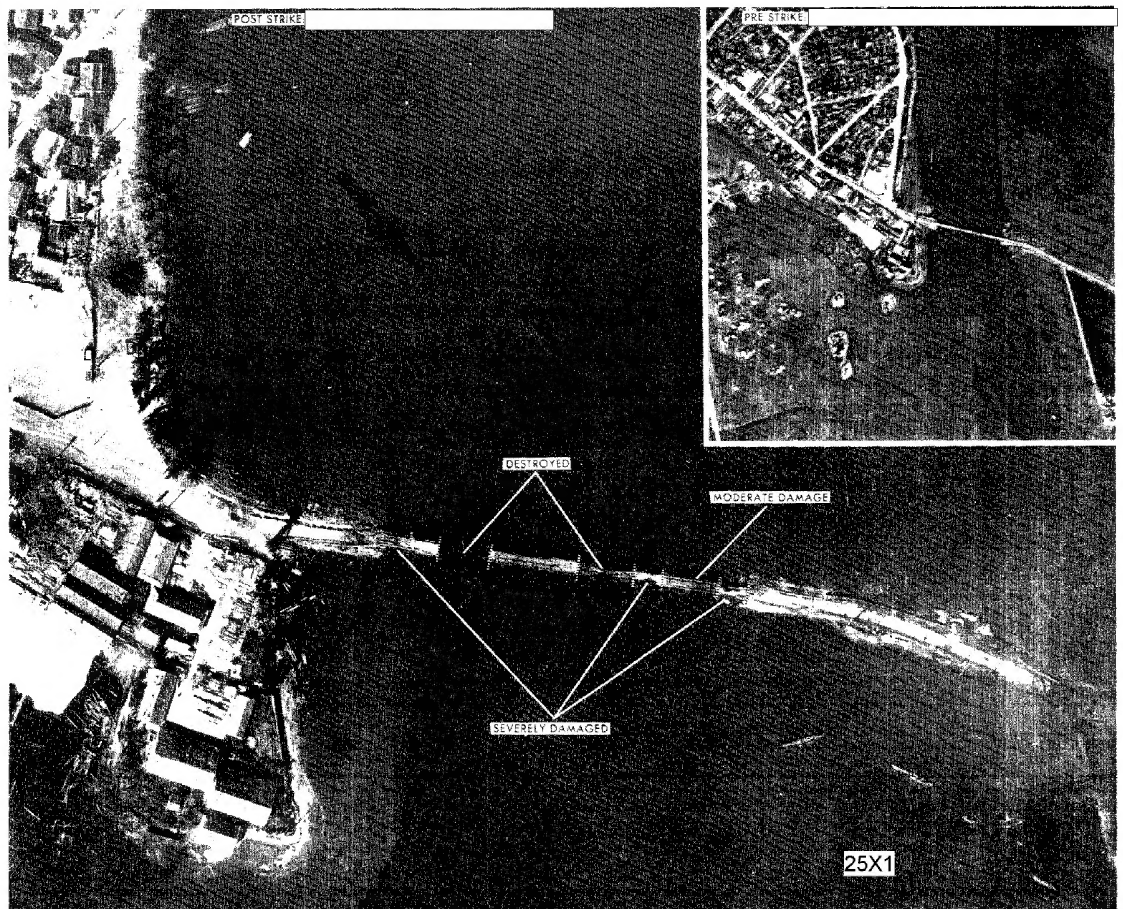
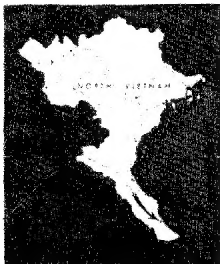
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Figure 3

NORTH VIETNAM
DONG HOI HIGHWAY BRIDGE
17 27 25 N 106 37 45 E



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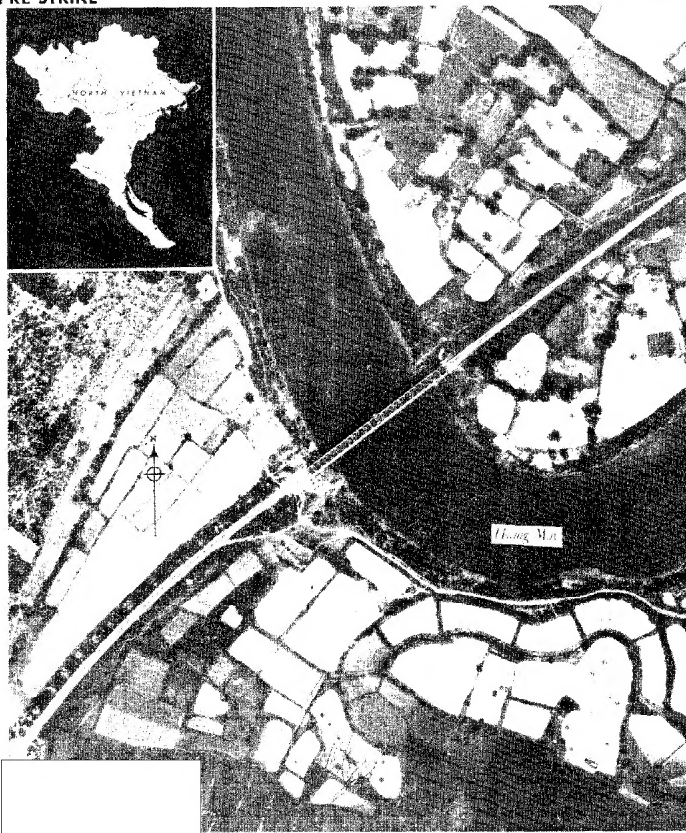
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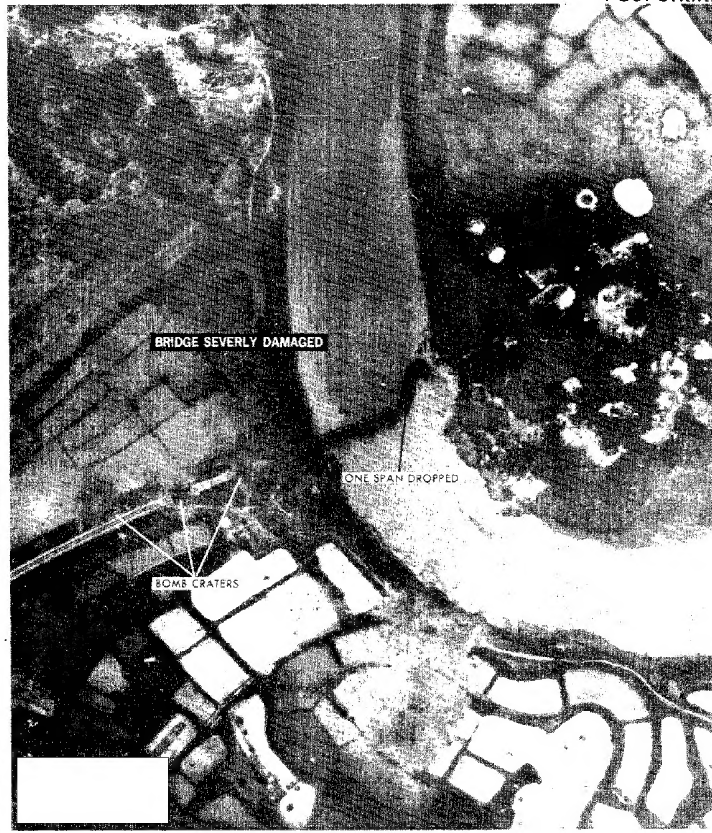
NORTH VIETNAM
QUI VINH RAILROAD BRIDGE
19 15 45 N 105 41 30 E

Figure 4

PRE STRIKE



POST STRIKE



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